THAT WHICH IS CLAIMED:

1. A composition comprising:

(a) a metal oxide;

(b) a silica-containing material;

(c) a gallium-containing material;

(d) an aluminum-containing material selected from the group consisting of alumina, aluminate, and combinations thereof; and

(e) a promoter metal

wherein at least a portion of said promoter metal is present as a reduced valence promoter metal.

2. A composition in accordance with claim 1 wherein said promoter metal is present in an amount, which will effect the removal of sulfur from a hydrocarbon stream when contacted with said composition under desulfurization conditions.

3. A composition in accordance with claim 1 wherein said promoter metal comprises a metal selected from the group consisting of nickel, cobalt, iron, manganese, copper, zinc, molybdenum, tungsten, silver, tin, antimony, vanadium, gold, platinum, ruthenium, iridium, chromium, palladium, titanium, zirconium, rhodium, rhenium, and combinations of any two or more thereof.

4. A composition in accordance with claim 1 wherein said metal oxide is present in an amount in the range of from about 10 to about 90 weight percent.

5. A composition in accordance with claim 1 wherein said metal oxide is present in an amount in the range of from about 30 to about 80 weight percent.

6. A composition in accordance with claim 1 wherein said metal oxide is present in an amount in the range of from 40 to 70 weight percent.

7. A composition in accordance with claim 1 wherein said promoter metal is present in an amount in the range of from about 1 to about 60 weight percent.

8. A composition in accordance with claim 1 wherein said promoter metal is present in an amount in the range of from about 5 to about 40 weight percent.

9. A composition in accordance with claim 1 wherein said promoter metal is present in an amount in the range of from 8 to 20 weight percent.

10. A composition in accordance with claim 1 wherein said silica-containing material is present in an amount in the range of from about 10

to about 40 weight percent and said aluminum-containing material is present in an amount in the range of from about 1 to about 30 weight percent.

11. A composition in accordance with claim 1 wherein said silica-containing material is present in an amount in the range of from about 12 to about 35 weight percent and said aluminum-containing material is present in an amount in the range of from about 5 to about 25 weight percent.

12. A composition in accordance with claim 1 wherein said silica-containing material is present in an amount in the range of from 15 to 30 weight percent and said aluminum-containing material is present in an amount in the range of from 10 to 22 weight percent.

13. A composition in accordance with claim 1 wherein said gallium-containing material is present in an amount in the range of from about 0.05 to about 30 weight percent based on the total weight of said composition.

14. A composition in accordance with claim 1 wherein said gallium-containing material is present in an amount in the range of from about 1 to about 20 weight percent based on the total weight of said composition.

15. A composition in accordance with claim 1 wherein said gallium-containing material is present in an amount in the range of from 5 to 10 weight percent based on the total weight of said composition.

16. A composition in accordance with claim 1 wherein said metal oxide comprises a metal selected from the group consisting of zinc,

manganese, silver, copper, cerium, scandium, lanthanum, iron, tin, cadmium, gallium, indium, niobium, tantalum, and combinations of any two or more thereof.

17. A composition in accordance with claim 16 wherein said metal is zinc.

18. A composition in accordance with claim 1 wherein said promoter metal comprises nickel.

19. A composition in accordance with claim 1 wherein said silica-containing material is present in the form of expanded perlite.

20. A composition in accordance with claim 19 wherein said expanded perlite is milled.

21. A composition in accordance with claim 1 wherein said composition is a particulate in the form of one of granules, extrudates, tablets, spheres, pellets, or miscrospheres.

22. A composition in accordance with claim 21 wherein said particulate is a microsphere.

23. A method for the production of a composition comprising:

(a) a step selected from the group consisting of:

(1) incorporating a gallium-containing substance into or onto a first calcined mixture, said first calcined mixture comprising a liquid, a

metal-containing compound, a silica-containing material, alumina, and a promoter metal, to form a first incorporated mixture; and

(2) incorporating a gallium-containing substance and a promoter metal simultaneously into or onto a second calcined mixture comprising a liquid, a metal-containing compound, silica-containing material, and alumina, to form a second incorporated mixture;

(b) drying said first incorporated mixture or said second incorporated mixture to form a dried incorporated mixture;

(c) calcining said dried incorporated mixture to form a calcined incorporated mixture;

(d) reducing said calcined incorporated mixture with a suitable reducing agent under suitable conditions to produce a composition having a reduced valence promoter content therein, and

(e) recovering said composition.

24. A method in accordance with claim 23 wherein said first calcined mixture is formed by:

(a) admixing: 1) a liquid, 2) a metal-containing compound, 3) a silica-containing material, 4) alumina, and 5) a promoter metal to form a mixture thereof;

(b) drying said mixture to form a dried mixture; and

(c) calcining said dried mixture to form said first calcined mixture.

25. A method in accordance with claim 23 wherein said first calcined mixture is formed by:

(a) admixing: 1) a liquid, 2) a metal-containing compound, 3) a silica-containing material, and 4) alumina to form a mixture thereof;

(b) drying said mixture to form a preliminary dried mixture;

(c) calcining said preliminary dried mixture to form a preliminary calcined mixture;

(d) incorporating a promoter metal into or onto said preliminary calcined mixture to form a promoted mixture;

(e) drying said promoted mixture to form a dried mixture; and

(f) calcining said dried mixture to form said first calcined mixture.

26. A method in accordance with claim 23 wherein said second calcined mixture is formed by:

(a) admixing: 1) a liquid, 2) a metal-containing compound, 3) a silica-containing material, and 4) alumina to form a mixture thereof;

(b) drying said mixture to form a dried mixture;

(c) calcining said dried mixture to form said second calcined mixture.

27. A method in accordance with claim 24 wherein said mixture from step (a) is in the form of one of a wet mix, dough, paste, or slurry.

28. A method in accordance with claim 25 wherein said mixture from step (a) is in the form of one of a wet mix, dough, paste, or slurry.

29. A method in accordance with claim 26 wherein said mixture from step (a) is in the form of one of a wet mix, dough, paste, or slurry.

30. A method in accordance with claim 23 wherein said calcined incorporated mixture is reduced in step (d) such that said composition will effect the removal of sulfur from a stream of hydrocarbons when such stream is contacted with same under desulfurization conditions.

31. A method in accordance with claim 23 wherein said promoter metal comprises a metal selected from the group consisting of nickel, cobalt, iron, manganese, copper, zinc, molybdenum, tungsten, silver, tin, antimony, vanadium, gold, platinum, ruthenium, iridium, chromium, palladium, titanium, zirconium, rhodium, rhenium, and combinations of any two or more thereof.

32. A method in accordance with claim 23 wherein said metal-containing compound comprises a metal selected from the group consisting of zinc, manganese, silver, copper, cerium, scandium, lanthanum, iron, tin, cadmium, gallium, indium, niobium, tantalum, and combinations of any two or more thereof.

33. A method in accordance with claim 23 wherein said silica-containing material is in the form of expanded perlite.

34. A method in accordance with claim 23 wherein said mixture from step (a) is particulated.

35. A method in accordance with claim 23 wherein said mixture from step (a) is particulated in the form of one of granules, extrudates, tablets, spheres, pellets, or microspheres prior to said drying in step (b).

36. A method in accordance with claim 23 wherein said incorporated mixture from step (b) is particulated by spray drying in step (c) so as to form said dried incorporated mixture.

37. A method in accordance with claim 23 wherein said first or second incorporated mixture is dried in step (b) at a temperature in the range of from about 65.5°C to about 550°C.

38. A method in accordance with claim 23 wherein said dried incorporated mixture is calcined in step (c) at a temperature in the range of from about 204.4°C to about 815.5°C.

39. A method in accordance with claim 23 wherein said composition recovered in step (f) comprises:

(a) a metal oxide;

(b) said silica-containing material;

(c) an aluminum-containing material selected from the group consisting of alumina, aluminate, and combinations thereof;

(d) a gallium-containing material; and

(e) a promoter metal

wherein at least a portion of said promoter metal is present as a reduced valence promoter metal.

40. A method in accordance with claim 39 wherein said metal oxide is present in an amount in the range of from about 10 to about 90 weight percent.

41. A method in accordance with claim 39 wherein said metal oxide is present in an amount in the range of from about 30 to about 80 weight percent.

42. A method in accordance with claim 39 wherein said metal oxide is present in an amount in the range of from 40 to 70 weight percent.

43. A method in accordance with claim 39 wherein said promoter metal is present in an amount in the range of from about 1 to about 60 weight percent.

44. A method in accordance with claim 39 wherein said promoter metal is present in an amount in the range of from about 5 to about 40 weight percent.

45. A method in accordance with claim 39 wherein said promoter metal is present in an amount in the range of from 8 to 20 weight percent.

46. A method in accordance with claim 39 wherein said silica-containing material is present in an amount in the range of from about 10 to about 40 weight percent and said aluminum-containing material is present in an amount in the range of from about 1 to about 30 weight percent.

47. A method in accordance with claim 39 wherein said silica-containing material is present in an amount in the range of from about 12 to about 35 weight percent and said aluminum-containing material is present in an amount in the range of from about 5 to about 25 weight percent.

48. A method in accordance with claim 39 wherein said silica-containing material is present in an amount in the range of from 15 to 30 weight percent and said aluminum-containing material is present in an amount in the range of from 10 to 22 weight percent.

49. A method in accordance with claim 39 wherein said gallium-containing material is present in an amount in the range of from about 0.05 to about 30 weight percent based on the total weight of said composition.

50. A method in accordance with claim 39 wherein said gallium-containing material is present in an amount in the range of from about 1 to about 20 weight percent based on the total weight of said composition.

51. A method in accordance with claim 39 wherein said gallium-containing material is present in an amount in the range of from 5 to 10 weight percent based on the total weight of said composition.

52. A method in accordance with claim 39 wherein said metal oxide comprises a metal selected from the group consisting of zinc, manganese, silver, copper, cerium, scandium, lanthanum, iron, tin, cadmium, gallium, indium, niobium, tantalum, and combinations of any two or more thereof.

53. A method in accordance with claim 52 wherein said metal is zinc.

54. A method in accordance with claim 39 wherein said promoter metal comprises a metal selected from the group consisting of nickel, cobalt, iron, manganese, copper, zinc, molybdenum, tungsten, silver, tin, antimony, vanadium, gold, platinum, ruthenium, iridium, chromium, palladium, titanium, zirconium, rhodium, rhenium, and combinations of any two or more thereof.

55. A method in accordance with claim 39 wherein said promoter metal is comprised of nickel.

56. A method in accordance with claim 23 wherein said calcined incorporated mixture is reduced in step (g) at a temperature in the range of from about 37.8°C to about 815.5°C and at a pressure in the range of

from about 15 to about 1500 psia and for a time sufficient to permit the formation of a reduced valence promoter metal.

57. A method in accordance with claim 23 wherein during said calcining of step (c) at least a portion of said alumina is converted to aluminate.

58. A composition prepared by the method of claim 23.

59. A composition prepared by the method of claim 24.

59. A composition prepared by the method of claim 24.

60. A composition prepared by the method of claim 25.

61. A composition prepared by the method of claim 26.

62. A composition prepared by the method of claim 39

63. A composition prepared by the method of claim 40.

64. A composition prepared by the method of claim 43.

65. A composition prepared by the method of claim 46.

66. A composition prepared by the method of claim 49.

67. A process for the removal of sulfur from a hydrocarbon stream comprising:

(a) contacting said hydrocarbon stream with a composition comprising a metal oxide, a silica-containing material, an aluminum-containing material selected from the group consisting of alumina, aluminate, and combinations thereof, a gallium-containing material, and a promoter metal wherein at least a portion of said promoter metal is present as a reduced

valence promoter and in an amount which will effect the removal of sulfur from said hydrocarbon stream in a desulfurization zone under conditions such that there is formed a desulfurized hydrocarbon stream and a sulfurized composition;

(b) separating said desulfurized hydrocarbon stream from said sulfurized composition thereby forming a separated desulfurized hydrocarbon stream and a separated sulfurized composition;

(c) regenerating at least a portion of said separated sulfurized composition in a regeneration zone so as to remove at least a portion of the sulfur contained therein and/or thereon thereby forming a regenerated composition;

(d) reducing said regenerated composition in an activation zone so as to provide a reduced composition having a reduced valence promoter metal content therein which will effect the removal of sulfur from a hydrocarbon stream when contacted with same; and thereafter

(e) returning at least a portion of said reduced composition to said desulfurization zone.

68. A process in accordance with claim 67 wherein said hydrocarbon stream comprises a fuel selected from the group consisting of cracked-gasoline, diesel fuel, and combinations thereof.

69. A process in accordance with claim 67 wherein said desulfurization in step (a) is carried out at a temperature in the range of from about 37.8°C to about 537.8°C and a pressure in the range of from about 15 to about 1500 psia for a time sufficient to effect the removal of sulfur from said stream.

70. A process in accordance with claim 67 wherein said regeneration in step (c) is carried out at a temperature in the range of from about 37.8°C to about 815.5°C and a pressure in the range of from about 10 to about 1500 psia for a time sufficient to effect the removal of at least a portion of the sulfur from said separated sulfurized composition.

71. A process in accordance with claim 67 wherein air is employed in step (c) as a regeneration agent in said regeneration zone.

72. A process in accordance with claim 67 wherein said regenerated composition from step (c) is subjected to reduction with hydrogen in step (d) in said reduction zone which is maintained at a temperature in the range of from about 37.8°C to about 815.5°C and at a pressure in the range of from about 15 to about 1500 psia and for a period of time sufficient to effect a reduction of the valence of the promoter content of said regenerated composition.

73. A process in accordance with claim 67 wherein said separated sulfurized composition from step (b) is stripped prior to introduction into said regeneration zone in step (c).

74. A process in accordance with claim 67 wherein said regenerated composition from step (c) is stripped prior to introduction to said reduction zone in step (d).

75. The cracked-gasoline product of the process of claim 68.

76. The diesel fuel product of the process of claim 68.